

INFORMATION: Fokker F27 and F28 Structural Integrity
Limits in Primary Aircraft Structure; AEU-100 Memo of
June 19, 1986.

AUG 15 1986

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The FAA policy with regard to allowing transport category airplanes to operate in revenue service with known cracks in primary flight structure is stated in our memorandum of March 8, 1983. However, revenue flights with cracks in primary structure are permitted when a damage tolerance assessment, based on fracture analyses, provides assurance that exposure to a failure load condition is not likely before repairs are accomplished. In the case where a crack will lower the residual strength below the design ultimate load level prior to the next scheduled inspection or repair, then the only regulatory basis for allowing continued revenue service is by an airworthiness directive (AD) under Part 39, which would prescribe repeated inspections and/or limit the number of operating cycles to prevent an unsafe condition.

If airplanes are allowed to operate with known cracks in primary structure, then an engineering assessment based on detailed fracture analyses of the individual cracks must be made to assure the cracks will not grow beyond the dimensions associated with ultimate residual strength, under the expected loading spectrum, before the next inspection or before they are repaired. Such inspection programs must be reviewed by the cognizant airworthiness authority to assure that airplanes with such cracks meet the same certification requirements as a healthy airplane and that the inspections will verify that no cracks exist in adjacent fastener holes or alternate load path structure.

The safety concern in flying with cracks in primary structure is in the likelihood that additional unknown cracks may also exist which in combination could weaken the structure to the extent that structural failure is possible before repairs are made. Also, a number of parts flying with cracks greatly increases the probability that one part will fail before it is repaired. For this reason, it is necessary to assess cracks in structure on a case by case basis.

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